

REMARKS

This application has been carefully reviewed in light of the Office Action dated May 16, 2002 (Paper No. 7). Claims 1 to 7, 9 to 18, and 25 to 31 are in the application, of which Claims 1, 25, 26 and 31 are independent. Reconsideration and further examination are respectfully requested.

Applicants' undersigned attorney wishes to memorialize a telephone interview conducted with the Examiner on June 5, 2002. In the telephone interview, the undersigned requested clarification of the status of Claims 8 and 9, pointing out that although those claims had otherwise been treated in the Office Action, they did not receive a rejection based on art. In the telephone interview, the Examiner confirmed his conclusion that the art would not have suggested the surface treatment and water repellency of Claims 8 and 9, and his further conclusion that those claims therefore recite allowable subject matter.

In keeping with this indication, each of independent Claims 1, 25, 26 and 31 have been amended to incorporate the subject matter of Claim 8, which has consequently been cancelled. It is therefore respectfully submitted that Claims 1, 25, 26 and 31, together with their respective dependent claims, are all fully in condition for allowance.

Claims 19 to 24, 32 and 33 have been cancelled.

In the now-superseded Office Action dated April 11, 2002, the Draftsman entered a drawing objection on form PTO-948. In keeping with this objection, new formal drawings are submitted herewith. Approval of these drawings is respectfully requested.

Turning to the instant Office Action of paper No. 7, the Abstract has been rewritten as requested.

An objection was lodged against the specification based on the subject matter of Claim 18, with the Office Action taking the position that Figure 12 shows pump B304 reducing pressure through suction port B123 and not through air outlet B410. Relatedly, Claims 1 to 31 were rejected under 35 U.S.C. § 112, first paragraph, based on an inquiry into how an air outlet can be used for making an ink container under negative pressure.

In response, Applicants respectfully submit that Figure 12 shows that suction port B123 is actually connected to air outlet B410. Accordingly, even though suction pump B304 is connected to suction port B123, by virtue of the connection between suction port B123 and air outlet B410, it is possible for suction pump B304 to reduce pressure in subtank B400 through air outlet B410. It is therefore respectfully submitted that the specification is correct as written with respect to Claim 18, and that the rejection of Claims 1 to 31 under the first paragraph of § 112 should be withdrawn.

An objection was lodged against the drawings for failure to show the spring described on page 17 and opening 120 described on page 24. In response to the former, since the spring is part of a needle covering mechanism not claimed in the instant application, page 17 has been amended to clarify that the spring is “unshown”. In response to the latter, page 24 has been amended to correct the reference number for the waste introduction opening, with a corresponding change being made on Figure 4 of the drawings

submitted herewith. In view of the foregoing, withdrawal of the drawing objections is respectfully requested.

Formal objections were lodged against Claims 10, 17 and 32, and Claims 12, 14, 15 to 18, 32 and 33 were rejected for formal reasons under 35 U.S.C. § 112, second paragraph. These matters have been attended to by amendment, above. Withdrawal thereof is respectfully requested.

Claims 1 to 6, 12, 15, 16 and 18 to 33 were rejected under 35 U.S.C. § 103(a) over U.S. Patent 5,663,754 (Lorenze) in view of U.S. Patent 5,509,140 (Koitabashi); and Claims 1 to 7 and 10 to 18 were rejected under § 103(a) over U.S. Patent 4,968,998 (Allen) in view of Lorenze and Koitabashi. The foregoing actions have been taken without prejudice or disclaimer of subject matter, and without conceding the correctness of the rejections, and merely to secure an earlier allowance. Accordingly, this should be viewed as a traversal of the § 103(a) rejections of the claims.

Regarding a formal matter, an Information Disclosure Statement is currently being prepared and will be filed presently. Should the Examiner reach this case before the Information Disclosure Statement is in his file, he is respectfully requested to contact the undersigned.

No other matters being raised, it is believed that the entire application is fully in condition for allowance, and such action is courteously solicited.

Applicants' undersigned attorney may be reached in our Costa Mesa,
California office by telephone at (714) 540-8700. All correspondence should continue to
be directed to our address given below.

Respectfully submitted,


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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO
ABSTRACT, SPECIFICATION, AND CLAIMS

IN THE ABSTRACT:

The abstract has been amended as follows:

An ink tank [comprises] includes an ink container containing an ink, an ink inlet for introducing the ink to the ink container, an air outlet for maintaining the ink container under negative pressure, and a gas-liquid separation [means] mechanism provided at the air outlet which passes gas but not liquid. [, wherein the] The ink is introduced to the ink container through the ink inlet by the negative pressure in the ink container, an inner surface of which being surface-processed, and the ink has surface tension of 28 mN/m or higher but not higher than 50 mN/m.

IN THE SPECIFICATION:

The paragraph bridging pages 17 and 18 has been amended as follows:

In the carriage B104 of FIG. 8, B124 is a needle cover. When the needle B122 and the joint C105 of the media pack are not connected, the cover B124 comes in a position to protect the needle B122, as shown in FIG. 8, by action of an unshown spring. On the other hand, [by the action of the spring as shown in FIG. 8. While,] when the needle B122 and the joint C105 are connected, the cover B124 is pushed upward against the force of the spring to release the protection of the needle B122. The moving position of the carriage B104 is detected by an

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encoder sensor B131 of the carriage B104 and a linear scale B132 (see FIG. 6) of the body of the printing unit B100. The movement of the carriage B104 to the home position is detected by an HP (home position) plug B133 of the carriage B104 and an HP sensor B134 (see FIG. 7) of the body of the printing unit B100.

The paragraph beginning at line 11 of page 24 has been amended as follows:

The media pack C100 has a waste introduction opening C120 (see FIG. 4) into which a waste joint B313 (see FIG. 10) installed at the tip of the waste tube B312 of the printing unit B100 is inlet. The media pack C100 is provided with a waste ink absorber C107 for containing waste ink introduced via [the] waste introduction opening C120 [120] from the pump cylinder B304.

IN THE CLAIMS:

The claims have been amended as follows:

1. (Amended) An ink tank for an ink-jet printing apparatus comprising:
 - (i) an ink container containing an ink;
 - (ii) an ink inlet for introducing an ink to the ink container; and

(iii) an air outlet for making the ink container under negative pressure in cooperation with the ink-jet printing apparatus, an ink being introduced to the ink container through the ink inlet when negative pressure is applied to the ink container,

wherein the ink tank further comprises gas-liquid separation means which does not pass liquid but gas at the air outlet, and wherein the ink has surface tension of 28 mN/m or higher but not higher than 50 mN/m; and wherein

an inner surface of the ink container has been subjected to a surface processing.

8. (Cancelled)

9. (Amended) The ink tank according to claim [8] 1, where the surface processing is a water-repellent processing.

10. (Amended) The ink tank according to claim 1, wherein the ink tank further comprises an ink outlet for discharging the ink in the ink container to the outside.

14. (Amended) An ink cartridge comprising an ink tank of claim 1 and an ink-jet recording head for ejecting the ink in the ink tank, wherein the ink-jet recording head is connected to [the] an ink outlet of the ink tank.

15. (Amended) An ink system comprising:

a first ink tank comprising an ink tank according to Claim 1;

[In] an ink supply device for providing [an] ink to [a] said first ink tank [of claim 1], the ink supply device comprising:

(i) a second ink tank for storing the ink to be introduced to the ink container of the first ink tank;

(ii) means for connecting the second ink tank with the ink inlet of the first ink tank; and

(iii) means for reducing a pressure in the ink container of the first ink tank through the air outlet of the first ink tank when the second ink tank is connected to the ink inlet of the first tank.

17. (Amended) The ink supply device according to claim 16, wherein the ink inlet of the first ink tank is provided with a hollow needle, and the ink is introduced from the second ink tank to the ink container through the needle and wherein the joint [unit] connects to the needle.

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Cancelled)

23. (Cancelled)

24. (Cancelled)

25. (Amended) An ink tank for an ink-jet printing apparatus, comprising

(i) an ink container containing an ink;

(ii) an ink inlet for introducing an ink to the ink container; and

(iii) an air outlet for making the ink container under negative pressure in

cooperation with the ink-jet printing apparatus, an Ink being introduced to the ink container through the ink inlet when negative pressure is applied to the ink container; [,]

wherein an inner surface of the ink container has been subjected to a surface processing; and.

wherein the ink tank further comprises a gas-liquid separation means which does not pass liquid but gas at the air outlet, and wherein the ink contains a surfactant in an amount of 1 wt % or less based on the total ink weight.

26. (Amended) A process for introducing an ink to a first ink tank for an ink-jet printing apparatus, the first ink tank comprising:

(i) an ink container containing an ink;

(ii) an ink inlet for introducing an ink to the ink container;

(iii) an air outlet for making the ink container under negative pressure in cooperation with the ink-jet printing apparatus, an ink being introduced to the ink container through the ink inlet when negative pressure is applied to the ink container; and

(iv) gas-liquid separation means which does not pass liquid but gas at the air outlet,

the process comprising the steps of:

connecting a second ink tank containing an ink to be introduced into the ink container of the first ink to the ink inlet; and

reducing pressure of the ink container of the first ink tank while the second ink tank and the ink inlet are being connected;

wherein an inner surface of the ink container has been subjected to a surface processing.

27. (Amended) The [method] process according to claim 26, wherein the gas-liquid separating means comprises a gas permeable membrane made of a porous material.

28. (Amended) The [method] process according to claim 27, wherein the gas permeable membrane is a resin porous material.

29. (Amended) The [method] process according to claim 28, wherein the resin porous material is a tetrafluoroethylene resin.

30. (Amended) The [method] process according to claim 26, wherein the method further comprises a step of stopping ink supply to the ink container when an ink level in the ink container has reached to the gas-liquid separation means.

31. (Amended) An ink tank for an ink-jet printing apparatus, comprising:

- (i) an ink container containing an ink;
- (ii) an ink inlet for introducing an ink into the ink container; and
- (iii) an air outlet for making the ink container under negative pressure in cooperation with the ink-jet printing apparatus, an ink being introduced to the ink container through the ink inlet when negative pressure is applied to the ink container,

wherein the ink tank further comprises a gas-liquid separation membrane which does not pass liquid but gas at the air outlet, [and] wherein the ink is free from disturbing gas permeability of the membrane, and wherein an inner surface of the ink container has been subjected to a surface processing.

32. (Cancelled)

33. (Cancelled)